
Annex 1

ANNEX 1 OF THE LIST OF DUAL-USE GOODS AND TECHNOLOGIES

Note This Annex contains a sub-set of the Items controlled by the List of Dual-Use Goods and Technologies.

N.B. Where abbreviated entries are used, see List of Dual-Use Goods and Technologies for full details. Text that differs from that in the List of Dual-Use Goods and Technologies is shaded.

Category 1

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|-----------------------|---|
| 1.A.2. | "Composite" structures or laminates.... |
| 1.C.1. | Materials specially designed for use as absorbers of electromagnetic waves... |
| 1.C.7.c. & 1.C.7.d. | Ceramic-ceramic "composite" materials..... |
| 1.C.10.c. & 1.C.10.d. | Fibrous or filamentary materials..... |
| 1.C.12. | Materials for nuclear heat sources... |
| 1.D. 2 | "Software" for the "development" of organic "matrix", metal "matrix" or carbon "matrix" laminates or "composites" listed on this Annex. |
| 1.E.1. | "Technology" according to the General Technology Note for the "development" or "production" of equipment and materials in 1.A.2. or 1.C. of this Annex. |
| 1.E. 2.e. & 1.E.2.f. | Other "technology"..... |

Category 2*

- | | |
|----------|--|
| 2.B.1.a. | Machine tools for turning, having all of the following characteristics: <ol style="list-style-type: none">1. Positioning accuracy with "all compensations available" equal to or less (better) than 3.6 µm according to ISO 230/2 (1997) or national equivalents** along any linear axis; <u>and</u>2. Two or more axes which can be coordinated simultaneously for "contouring control". |
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* Italy and Switzerland reserve the right to notify only denials on machine-tools in 2.B.1.a. and 2.B.1.b. of this Annex.

** Governments may use the parameter of less (better) than 4 µm according to ISO 230/2 (1988) for an intermediate period of one year after entry into force.

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- 2.B.1.b. Machine tools for milling, having any of the following characteristics:
- 1.a. Positioning accuracy with "all compensations available" equal to or less (better) than 3.6 μm according to ISO 230/2 (1997) or national equivalents** along any linear axis; and
 - b. Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control"; or
- 2.B.1.b. 2. Five or more axes which can be coordinated simultaneously for "contouring control" and have a positioning accuracy with "all compensations available" equal to or less (better) than 3.6 μm according to ISO 230/2 (1997) or national equivalents** along any linear axis; or
3. A positioning accuracy for jig boring machines, with "all compensations available", equal to or less (better) than 3 μm according to ISO 230/2 (1997) or national equivalents** along any linear axis;
- 2.B.1.d. Electrical discharge machines (EDM)....
- 2.B.1.f. Deep-hole-drilling machines....
- 2.B.3. "Numerically controlled" or manual machine tools....
- 2.D.1. "Software", other than that controlled by 2.D.2., specially designed for the "development" or "production" of equipment in 2.B. of this Annex.
- 2.E.1. "Technology" according to the General Technology Note for the "development" of equipment or "software" in 2.B. or 2.D. of this Annex.
- 2.E.2. "Technology" according to the General Technology Note for the "production" of equipment in 2.B. of this Annex.

Category 3

- 3.A.2.g.2. Atomic frequency standards....
- 3.B.1.a.2. Metal organic chemical vapour deposition reactors....
- 3.D.1. "Software" specially designed for the "development" or "production" of equipment in 3.A.2.g. or 3.B. of this Annex.
- 3.E.1. "Technology" according to the General Technology Note for the "development" or "production" of equipment in 3.A. or 3.B. of this Annex.

** Governments may use the parameter of less (better) than 4 μm according to ISO 230/2 (1988) for an intermediate period of one year after entry into force.

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Category 4

4.A.1.a.2. Electronic computers.....radiation hardened;
4.A.3.b. "Digital computers" having a "composite theoretical performance" ("CTP") exceeding 4,000 Mtops.

4.A.3.c. "Electronic assemblies" specially designed or modified for enhancing performance by aggregation of "computing elements" ("CEs") so that the "CTP" of the aggregation exceeds the limit in 4.A.3.b in this Annex.

Note 1 4.A.3.c. applies only to "electronic assemblies" and programmable interconnections not exceeding the limit in 4.A.3.b. in this Annex when shipped as unintegrated "electronic assemblies".

Note 2 4.A.3.c. does not control "electronic assemblies" specially designed for a product or family of products whose maximum configuration does not exceed the limit of 4.A.3.b. in this Annex.

4.D.1. "Software" specially designed for the "development" or "production" of equipment or "software" in 4.A. or 4.D. of this Annex.

4.E.1. "Technology" according to the General Technology Note for the "development" or "production" of equipment or "software" in 4.A. or 4.D. of this Annex.

Category 5 - Part 1

5.A.1.b.3. Being radio equipment

5.A.1.b.4. Being digitally controlled radio receivers...

5.B.1.a. Equipment and specially designed components or accessories therefor, specially designed for the "development", "production" or "use" of equipment, functions or features in Category 5 - Part 1 of this Annex.

5.D.1.a. "Software" specially designed for the "development" or "production" of equipment, functions or features in Category 5 - Part 1 of this Annex.

5.D.1.b. "Software" specially designed or modified to support "technology" listed under 5.E.1. of this Annex.

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5.E.1.a. "Technology" according to the General Technology Note for the "development" or "production" of equipment, functions, features or "software" in Category 5 - Part 1 of this Annex.

Category 5 - Part 2 - None

Category 6

6.A.1.a.1.b. Object detection or location systems having any of the following:

1. A transmitting frequency below 5 kHz;
2. Sound pressure level exceeding 224 dB (reference 1 µPa at 1 m) for equipment with an operating frequency in the band from 5 kHz to 24 kHz inclusive;
3. Sound pressure level...;
4. Forming beams of ...;
5. Designed to operate...;
6. Designed to withstand...;

6.A.1.a.2.a.1. Hydrophones...Incorporating...

6.A.1.a.2.a.2. Hydrophones...Having any...

6.A.1.a.2.a.7. Hydrophones...Designed for...

6.A.1.a.2.b. Towed acoustic hydrophone arrays...

6.A.1.a.2.c. Processing equipment, specially designed for real time application with towed acoustic hydrophone arrays, having "user accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes;

6.A.1.a.2.d. Heading sensors....

6.A.1.a.2.e. Bottom or bay cable systems having any of the following:

1. Incorporating hydrophones...
2. Incorporating multiplexed hydrophone group signals ...; or

6.A.1.a.2.f. Processing equipment, specially designed for real time application with bottom or bay cable systems, having "user accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes;

6.A.2.a.1.a. 6.A.2.a.1.b. "Space-qualified" solid-state detectors.....

"Space-qualified" solid-state detectors.....

6.A.2.a.1.c. "Space-qualified" solid-state detectors...

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- 6.A.2.a.2.a. Image intensifier tubes ...
1. A peak response...
 2. A microchannel plate...
 3. Photocathodes, as follows:
 - a. S-20, S-25 or multialkali photocathodes with a luminous sensitivity exceeding 550 $\mu\text{A/lm}$;
 - b. GaAs or GaInAs photocathodes;
 - c. Other III-V compound semiconductor photocathodes.

- 6.A.2.a.3. Non-space qualified "focal plane arrays" ...;

Note 3

In 6.A.2.a.3. the following "focal plane arrays" are not included in this Annex:

- a. *Platinum Silicide (PtSi) "focal plane arrays" having less than 10,000 elements;*
- b. *Iridium Silicide (IrSi) "focal plane arrays".*

- 6.A.2.a.3.

Note 4

In 6.A.2.a.3. the following "focal plane arrays" are not included in this Annex:

- a. *Indium Antimonide (InSb) or Lead Selenide (PbSe) "focal plane arrays" having less than 256 elements;*
- b. *Indium Arsenide (InAs) "focal plane arrays";*
- c. *Lead Sulphide (PbS) "focal plane arrays";*
- d. *Indium Gallium Arsenide (InGaAs) "focal plane arrays".*

Note 5

In 6.A.2.a.3. Mercury Cadmium Telluride (HgCdTe) "focal plane arrays" as follows are not included in this Annex:

1. *Scanning Arrays having any of the following:*
 - a. *30 elements or less; or*
 - b. *incorporating time delay-and-integration within the element and having 2 elements or less;*
2. *Staring Arrays having less than 256 elements.*

- 6.A.2.a.3.

Technical Notes

'Scanning Arrays' are defined as "focal plane arrays" designed for use with a scanning optical system that images a scene in a sequential manner to produce an image;

'Staring Arrays' are defined as "focal plane arrays" designed for use with a non-scanning optical system that images a scene.

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Note 6

In 6.A.2.a.3. the following "focal plane arrays" are not included in this Annex:

- a. Gallium Arsenide (GaAs) or Gallium Aluminum Arsenide (GaAlAs) quantum well "focal plane arrays" having less than 256 elements;*
- b. Pyroelectric or Ferroelectric (including barium-strontium titanate, lead zirconate titanate or lead scandium titanate) "focal plane arrays" having less than 8,000 elements;*
- c. Vanadium Oxide-Silicon nitride microbolometer "focal plane arrays" having less than 8,000 elements.*

- 6.A.2.b. "Monospectral imaging sensors" and "multispectral imaging sensors"....
- 6.A.2.c. Direct view imaging equipment operating in the visible or infrared spectrum, incorporating any of the following:
1. Image intensifier tubes having the characteristics listed in 6.A.2.a.2.a. of this Annex; or
 2. "Focal plane arrays" having the characteristics listed in 6.A.2.a.3. of this Annex;
- 6.A.2.e. "Space-qualified" "focal plane arrays"....
- 6.A.3.b. 3 Imaging cameras incorporating image intensifier tubes having the characteristics listed in 6.A.2.a.2.a. of this Annex;
- 6.A.3.b.4 Imaging cameras incorporating "focal plane arrays" having the characteristics listed in 6.A.2.a.3. of this Annex;
- 6.A.4.c. "Space-qualified" components for optical systems....
- 6.A.4.d. Optical control equipment.....
- 6.A.6.g. Magnetic compensation systems...
- Note In 6.A.6.g. those compensators which provide only absolute values of the earth's magnetic field as output, (i.e., the frequency bandwidth of the output extends from DC to at least 0.8 Hz) are not included in this Annex.*
- 6.A.6.h. "Superconductive" electromagnetic sensors.....
- 6.A.8.d. Radar systems.....Capable of...
- 6.A.8.h. Radar systems...Employing processing
- 6.A.8.k. Radar systems...Having "signal processing"...
- 6.A.8.l.3. Radar systems...Having data processing...
Processing for...
- 6.B.8. Pulse radar cross-section...

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- 6.D.1. "Software" specially designed for the "development" or "production" of equipment in 6.A.4., 6.A.8. or 6.B.8. of this Annex.
- 6.D.3.a. "Software", as follows:...
- 6.E.1. "Technology" according to...
- 6.E.2. "Technology" according to the General Technology Note for the "production" of equipment in 6.A. or 6.B. of this Annex.

Category 7

- 7.D.2. "Source code" for the "use"...
- 7.D.3.a. "Software" specially designed or modified to...
- 7.D.3.b. "Source code" for...
- 7.D.3.c. "Source code" for...
- 7.D.3.d.1. to 4. & 7. "Source code" for the "development" of...
- 7.E.1. & 7.E.2. "Technology" according to the General Technology Note...

Category 8

- 8.A.1.b. Manned, untethered submersible vehicles...
- 8.A.1.c. Unmanned, tethered submersible vehicles.....
- 8.A.1.d. Unmanned, untethered submersible vehicles...
- 8.A.2.b. Systems specially designed or modified for the automated control of the motion of submersible vehicles in 8.A.1. of this Annex using navigation data and having closed loop servo-controls:
1. Enabling...;
 2. Maintaining...; or
 3. Maintaining...;
- 8.A.2.h. "Robots" specially designed for underwater use.....
- 8.A.2.j. Air independent power systems.....
- 8.A.2.o.3. Noise reduction systems for use on vessels...
- 8.A.2.p. Pumpjet propulsion systems....
- 8.D.1. "Software" specially designed for the "development" or "production" of equipment in 8.A. of this Annex.
- 8.D.2. Specific "software" ...
- 8.E.1. "Technology" according to the General Technology Note for the "development" or "production" of equipment in 8.A. of this Annex.
- 8.E.2.a. Other "technology".....

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Category 9

9.A.11.	Ramjet, scramjet or combined cycle engines...
9.B.1.b.	Ceramic cores or shells
9.D.1.	"Software" specially designed or modified for the "development" of equipment or "technology" in 9.A., 9.B. or 9.E.3. of this Annex.
9.D.2.	"Software" specially designed or modified for the "production" of equipment in 9.A. or 9.B. of this Annex.
9.D.4.a.	Other "software"...2D or 3D...
9.D.4.c.	Other "software"... "Software" specially...
9.E.1.	"Technology" according to the General Technology Note.....
9.E.2.	"Technology" according to the General Technology Note...
9.E.3.a.1.	Other "technology"... Gas turbine blades...
9.E.3.a.2. to 5. &	Other "technology"...
9.E.3.a.8., 9.E.3.a.9.	